Visualizing Voice with Tangible User Interface in VR

Abstract

- using visual and audio cues to encourage vocalization
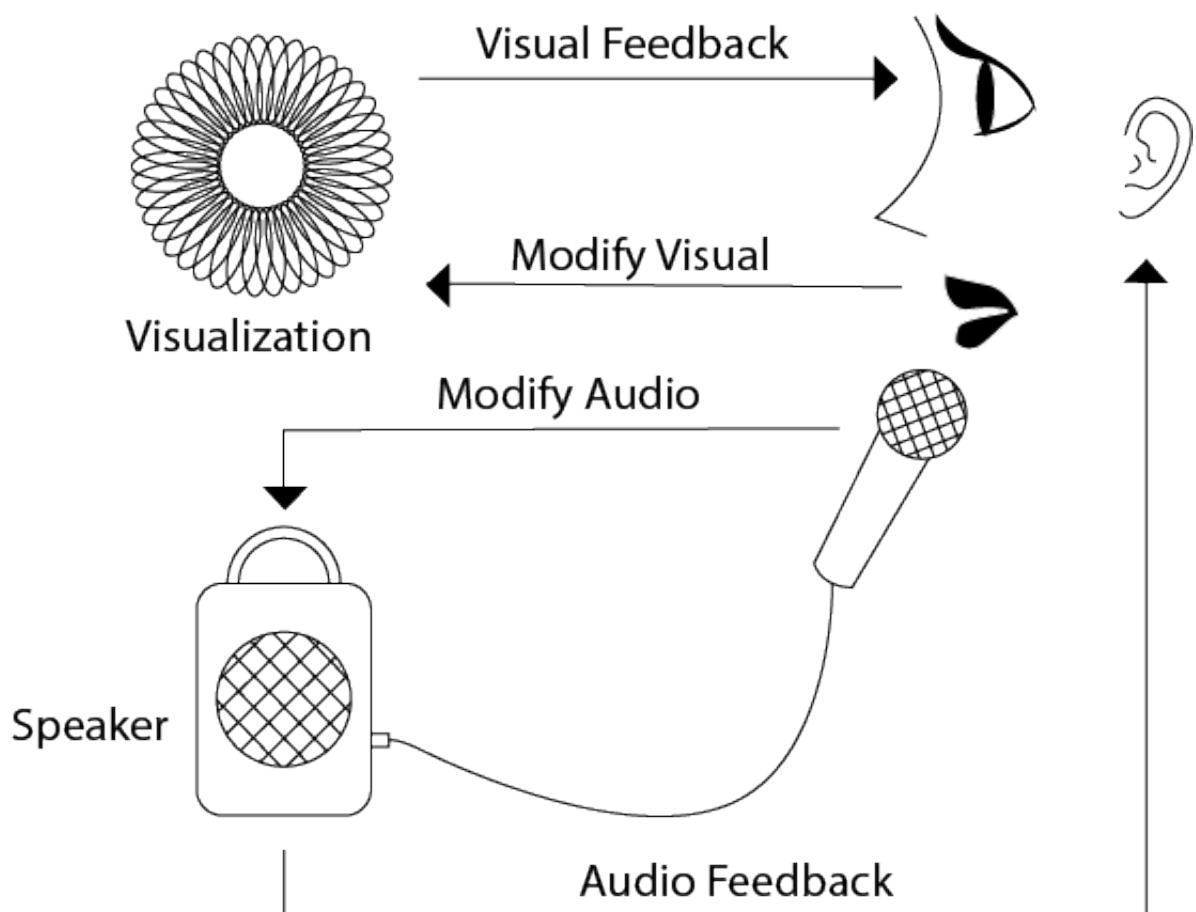
Acknowledgement

- List of people to thank.

1.Introduction

The project combines a spherical tangible vr controller with a voice input visualization project.

The diagram below demonstrates the feedback loop involved in the voice input visualization project.

Adding the sphere as a controller to modify the audio gives a third modality to the interaction between the user and the sound.

- 1.1 Problem Statement

  The project focuses on interfacing between the human user and virtual reality through visual, audio and haptic feedback.

- 1.2 Relevance of the Research

How will the work contribute to the current body of knowledge, and how does it address interdisciplinarity.

Major discipline:

- audio engineering (DSP/Ringmod)
- Mathematics (lissajou figure)
- Human Computer Interaction (User study)
- Psycology (User study + study on children with ASD)

2. Literature Review

Review the state of the field, discuss the main directions, and other related work, and where the research fits in and diverges with your work.

- On use case in ASD: Hailpern, Joshua & Karahalios, Karrie & Halle, Jim. (2009). **Creating a Spoken Impact: Encouraging Vocalization through Audio Visual Feedback in Children with ASD**
- On genereal user research methods in Tangible HCI (example of project): David Englmeier, Isabel Scho¨newald, Andreas Butz LMU Munich Munich, Germany, Tobias Ho¨llerer University of California Santa Barbara Santa Barbara. **Feel the Globe: Enhancing the Perception of Immersive Spherical Visualizations with Tangible Proxies**
- On VR narratives: Tangible VR: **Diegetic Tangible Objects for Virtual Reality Narratives, Ryerson University1 York University2, Toronto, ON, Canada Toronto, ON, Canada**

3. Methods

Map rotation of sphere on x, y, z axis to amplitude (loudness), frequency (pitch) and waveform features (timbre).

Use ring modulation as the main modulation method in order to generate lissajou figures.

go towards designing an interaction that encourages vocalization and movement, especially in social context. Then do a user research on human subjects, particularly on children or adults who suffer from autism. Audio interest: ring modulation. Visual interest: lissajou figure. Tangible interest: movement of rotation, and passing object from one person to another to encourage social action.

4. Results

How the paper and research express the methods.

5. Evaluation and Assessment

How the paper and research express the methods.

6. Future Work

7. Conclusion

Discuss results. Generally brief.

8. Bibliography

The bibliography supports the literature review, and the research.

Appendix (glossary)

Relevant resources

https://en.wikipedia.org/wiki/Lissajous_curve

https://en.wikipedia.org/wiki/Ring_modulation

https://www.britannica.com/science/timbre